

**DIRECTORATE OF GOVERNMENT EXAMINATION CHENNAI-6  
HIGHER SECONDARY (FIRST YEAR) EXAMINATION - MARCH-2024  
CHEMISTRY ANSWERS KEY**

- Note:** 1. Answers written only in **BLACK** or **BLUE** should be evaluated.  
2. Choose the most suitable answer **PART-I** from the given option alternatives and write the option code and the corresponding answer.

**PART - I****Maximum Marks : 70****Answer All the Questions.****15×1=15**

TYPE A			TYPE B			Mark
Q.No	Option	Answer	Q.No	Option	Answer	
1.	(b)	-NO <sub>2</sub>	1.	(a)	rich in dissolved oxygen	1
2.	(c)	free radical	2.	(a)	6.022×10 <sup>20</sup>	1
3.	(a)	4l+2	3.	(d)	Fe <sub>4</sub> [Fe(CN) <sub>6</sub> ] <sub>3</sub>	1
4.	(c)	=0	4.	(a)	Square pyramidal	1
5.	(a)	rich in dissolved oxygen	5.	(a)	31.1°C	1
6.	(a)	6.022×10 <sup>20</sup>	6.	(b)	Castner's process	1
7.	(a)	31.1°C	7.	(b)	-NO <sub>2</sub>	1
8.	(c)	Freon-112	8.	(d)	-1	1
9.	(d)	Fe <sub>4</sub> [Fe(CN) <sub>6</sub> ] <sub>3</sub>	9.	(c)	Ethanol + Water	1
10.	(c)	Ethanol + Water	10.	(a)	4l+2	1
11.	(a)	Assertion is true and Reason is false	11.	(c)	free radical	1
12.	(b)	Castner's process	12.	(c)	Freon-112	1
13.	(d)	-1	13.	(c)	=0	1
14.	(a)	Square pyramidal	14.	(a)	CO+H <sub>2</sub>	1
15.	(a)	CO+H <sub>2</sub>	15.	(a)	Assertion is true and Reason is false	1

**Part – II****Answer any SIX Questions. Question No.24 is compulsory. 6×2=12**

Q.No	ANSWER	Marks
16	Electro negativity - Correct Definition	2
17	Equivalent Mass - Correct Definition (or) Equivalent mass = $\frac{\text{Molar mass}}{\text{Equivalence factor}}$	2

18	$\text{CaCO}_3 \rightleftharpoons \text{CaO} + \text{CO}_2$	2
19	Dalton's law of partial pressure Correct Statement (or) $P_{\text{total}} = P_1 + P_2 + P_3$	2
20	a) $\text{BF}_3 - \text{Sp}^2$ b) $\text{CH}_4 - \text{SP}^3$ c) $\text{PCl}_5 - \text{Sp}^3\text{d}$ d) $\text{SF}_6 - \text{Sp}^3\text{d}^2$	$4 \times \frac{1}{2}$
21	Green house effect – Correct Definition	2
22	Benzene to BHC <div style="text-align: center;"> <p>benzene</p> <p>BHC</p> </div> <p style="text-align: center;">(or)</p> <p style="text-align: center;">Benzene + chlorine <math>\xrightarrow{\text{uv}}</math> Benzene hexa chloride (or) BHC          (without UV or sunlight) -----&gt; <math>1\frac{1}{2}</math>          Explanation only -----&gt; 1</p>	2
23	Homologous series – definition One example (or) general formula -----> 1	2
24	Molality (m) = $\frac{\text{No. of moles of solute}}{\text{mass of the solvent in kg}}$ $= \frac{90}{180} / 2$ $= 0.25 \text{ m}$	1  $\frac{1}{2}$  $\frac{1}{2}$

### Part - III

Answer **Any Six** Questions. Question No.33 is **compulsory**.

**6×3=18**

Q.No	ANSWER	Mark s
25.	Any orbital definition	1
	$3P_x \quad n=3, l=1$	1
	$4d_{x^2-y^2} \quad n=4, l=2$	1
26.	Uses of hydrogen – any three (1+1+1)	3
27.	Periodic trend of Ionisation energy	
	IE decreases down a group (or top to bottom) IE increases along a period (or left to right)	$1\frac{1}{2}$ $1\frac{1}{2}$

28.	$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$	1	
	$K_c = \frac{[HI]^2}{[H_2][I_2]}$		1
	$K_c = \frac{(2x/v)^2}{(\frac{a-x}{v})(\frac{b-x}{v})}$ (or) $K_c = \frac{4x^2}{(a-x)(b-x)}$		
If $\Delta n_g = 0$ , so, $K_c = K_p$		1	
29.	Pi bond – Correct definition pictorial representation -----> 2 Correct example -----> 1	3	
30.	Hess's law – correct definition (or) $\Delta H_r = \Delta H_1 + \Delta H_2 + \Delta H_3$	3	
31.	Nucleophile and electrophile – any three differences	3	
32.	Correct SN <sup>2</sup> Mechanism Correct explanation only ----> 2	3	
33.	A) CH <sub>2</sub> – Br (or) 1, 2 –dibromo ethane   CH <sub>2</sub> –Br	1	
	B) CH <sub>2</sub> = CH – Br (or) Vinyl bromide (or) Bromo ethene	1	
	C) CH ≡ CH (or) Acetylene (or) ethyne	1	

## Part - IV

Answer All the Questions :

5×5=25

Q.No	ANSWER	Marks	
34. (a)	(i). Tabular column with simple ratio for Three elements Simple ratio for Two elements -----> 1 Empirical formula – CH <sub>2</sub> O	2	5
	(ii). <b>Spin Quantum Number</b> Statement (or) $S = +\frac{1}{2}$ or $-\frac{1}{2}$ (OR)	1	
		2	
(b)	Similarities between Beryllium and Aluminium Any five similarities		5
35 (a)	(i) Interstitial hydrides Correct definition Any one example	2	5
	(ii) Electronic configuration: Lanthanides $4f^{1-14} 5d^{0-1} 6s^2$ Actinides $5f^{0-14} 6d^{0-2} 7s^2$ (OR)	1 1 1	
35(b)	<b>Characteristics of Internal Energy</b> 1) Extensive property 2) State function 3) $\Delta U = U_f - U_i$ (or) $U_2 - U_1$ 4) For cyclic process $\Delta U = 0$ 5) If $U_f < U_i$ , $\Delta U = -ve$ 6) If $U_f > U_i$ , $\Delta U = +ve$ (Any Five characters)	5×1	5

<b>36</b> <b>(a)</b>	(i) Raoult's law – Correct statement (or) $P_A \propto X_A$ (or) $P_A = K X_A$ ii) Volume correction : Excluded volume for two molecules = 8 Vm Excluded volume for single molecules = 4 Vm (or) Excluded volume for 'n' molecules = nb $V_{ideal} = V - nb$ (OR)	<b>2</b>          <b>1</b>       <b>1</b>       <b>1</b>	                      <b>5</b>
<b>(b)</b>	Vant Hoff equation : $\Delta G^0 = -RT \ln K$ $\Delta G^0 = \Delta H^0 - T\Delta S^0$ $-RT \ln K = \Delta H^0 - T\Delta S^0$ (or) $\ln k = \frac{-\Delta H^0}{RT} + \frac{\Delta S^0}{R}$ $\frac{d(\ln k)}{dT} = \frac{\Delta H^0}{RT^2}$ $\log \frac{k_2}{k_1} = \frac{\Delta H^0}{2.303R} \left[ \frac{T_2 - T_1}{T_2 T_1} \right]$	                     <b>1</b>       <b>1</b>       <b>1</b>       <b>1</b>       <b>1</b>	                     <b>5</b>
<b>37</b> <b>(a)</b>	Formation of N <sub>2</sub> Molecule : ❖ MO energy diagram ❖ Electronic configuration of N <sub>2</sub> molecule ❖ Bond order = 3 ❖ No unpaired electron (or) diamagnetic (OR)	                     <b>2</b>       <b>1</b>       <b>1</b>       <b>1</b>       <b>1</b>	                     <b>5</b>
<b>(b)</b>	IUPAC Name i) A) Propanoic acid B) 3- Pentanone or pentan 3- one C) N,N – dimethyl Propan -1-amine ii) $\beta$ – elimination Correct equation without condition (alc-KOH) <b>1½</b> correct explanation <b>1</b>	                     <b>1</b>       <b>1</b>       <b>1</b>       <b>2</b>	                     <b>5</b>
<b>38(a)</b>	Preparation of benzene : Acetylene - benzene i) A) Correct equation with condition without temperature (or) Correct explanation -----> 1 B) Phenol – benzene Correct equation Correct explanation -----> 1 ii) Uses of DDT - Any two uses (OR)	                     <b>1½</b>                     <b>1½</b>       <b>2</b>	                     <b>5</b>
<b>(b)</b>	Formation of acid rain Effects of acid rain (Any Three effects)	                     <b>2</b>       <b>3</b>	                     <b>5</b>